CLAIMS

1. A method of determining atrial fibrillation risk, the method comprising

obtaining a hemodynamic signal with a hemodynamic sensor;

detecting high risk patterns within the hemodynamic signal with a processor, wherein detecting high risk patterns comprises monitoring the area under the curve of pulses within the hemodynamic signal by the processor, and wherein high risk patterns are determined to be detected by the processor when the area under the curve of one or more pulses within the hemodynamic signal is less than a first pre-determined threshold;

triggering an obtaining of an electrocardiographic signal (ECG signal) with an electrocardiogram (ECG) sensor when said high risk patterns are detected with the processor;

determining pulse transit times (PTTs) between pulses of the ECG signal and the hemodynamic signal, by the processor; and

determining atrial fibrillation risk when the variability of the PTT exceeds a pre-determined PTT threshold, by the processor.

~~obtaining an electrocardiographic signal (ECG signal) with an electrocardiogram (ECG) sensor; and~~

~~determining atrial fibrillation risk based on the ECG signal and hemodynamic signal with a processor, the method further comprising~~

~~detecting high risk patterns within the hemodynamic signal with the processor; and~~

~~triggering the obtaining of the ECG signal when high risk patterns are detected with the processor,~~

~~wherein detecting high risk patterns comprises monitoring the area under the curve of pulses within the hemodynamic signal by the processor.~~

~~2. The method as claimed in claim 1, wherein high risk patterns are determined to be detected by the processor when the area under the curve of one or more pulses within the hemodynamic signal is less than a first pre-determined threshold.~~

~~3. The method as claimed in any one of claims 1 to 2, further comprising determining pulse transit times (PTTs) between pulses of the ECG signal and the hemodynamic signal, by the processor.~~

~~4. The method as claimed in claim 3, wherein atrial fibrillation risk is determined when the variability of the PTT exceeds a pre-determined PTT threshold, by the processor.~~

~~5~~2. The method as claimed in claim ~~3 or 4~~1, further comprising storing or transmitting the ECG signal for further analysis when the variability of the PTT exceeds a pre-determined PTT threshold by a data storage unit or transceiver.

~~6~~3. The method as claimed in any one of the preceding claims, wherein the hemodynamic signal is obtained using a capillary sensor, an arterial sensor, or both.

~~7~~4. The method as claimed in claim ~~6~~3, wherein the capillary sensor is an optical pulse oximeter and the arterial sensor is a modulated magnetic signature of blood (MMSB) sensor.

~~8~~5. The method as claimed in any one of the preceding claims, wherein the ECG signal is obtained using a finger-based ECG sensor.

~~9~~6. A device for determining atrial fibrillation risk, the device comprising

a hemodynamic sensor for obtaining a hemodynamic signal;

an electrocardiogram (ECG) sensor for obtaining an electrocardiographic signal (ECG signal); and

a processor configured for

detecting high risk patterns within the hemodynamic signal when the area under the curve of one or more pulses within the hemodynamic signal is less than a first pre-determined threshold;

triggering an obtaining of the ECG signal with an electrocardiogram (ECG) sensor when said high risk patterns are detected;

determining pulse transit times (PTTs) between pulses of the ECG signal and the hemodynamic signal; and

determining atrial fibrillation risk when the variability of the PTT exceeds a pre-determined PTT threshold.

~~determining atrial fibrillation risk based on the ECG signal and hemodynamic signal, wherein the processor is further configured for~~

~~detecting high risk patterns within the hemodynamic signal; and~~

~~triggering the obtaining of the ECG signal when high risk patterns are detected, and wherein the processor is further configured for detecting high risk patterns based on monitoring the area under the curve of pulses within the hemodynamic signal.~~

~~10. The device as claimed in claim 9, wherein the processor is further configured to detect high risk patterns when the area under the curve of one or more pulses of the hemodynamic signal is less than a first pre-determined threshold.~~

~~11. The device as claimed in any one of claims 9 to 10, wherein the processor is further configured to determine pulse transit times (PTTs) between pulses of the ECG signal and the hemodynamic signal.~~

~~12. The device as claimed in claim 11, wherein atrial fibrillation risk is determined by the processor when the variability of the PTT exceeds a pre-determined PTT threshold.~~

~~13~~7. The device as claimed in claim ~~11 or 12~~6, further comprising a data storage unit for storing the ECG signal for further analysis when the variability of the PTT exceeds a pre-determined PTT threshold.

~~14~~8. The device as claimed in claim ~~11 or 12~~6, further comprising a transceiver for transmitting the ECG signal for further analysis when the variability of the PTT exceeds a pre-determined PTT threshold.

~~15~~9. The device as claimed in any one of claims ~~9 to 14~~6 to 8, wherein the hemodynamic sensor comprises one or both of a capillary sensor and an arterial sensor.

~~16~~10. The device as claimed in claim ~~15~~9, wherein the capillary sensor is an optical pulse oximeter and the arterial sensor is a modulated magnetic signature of blood (MMSB) sensor.

~~17~~11. The device as claimed in any one of claims ~~9 to 16~~6 to 10, wherein the ECG sensor comprises a finger-based ECG sensor.

~~18~~12. The device as claimed in any one of claims ~~9 to 17~~6 to 11, wherein the device is housed within a brace-housing capable of being worn on a limb of a user.

~~19~~13. The device as claimed in claim ~~18~~12, wherein the ECG sensor comprises a first lead positioned on the back surface of the strap; and a second lead positioned on the front surface of the strap, such that when worn on the limb of the user, the ECG sensor is capable of obtaining ECG signals of a user, when

the first lead is in physical contact with the limb of the user; and

the second lead receives a digit on an opposing limb of the user.

~~20~~14. The device as claimed in claim ~~19~~13, wherein the hemodynamic sensor is capable of obtaining hemodynamic signal from a wrist area of a person, when the device is worn on the wrist area.

~~21~~15. The device as claimed in claim ~~19~~13, wherein the hemodynamic sensor comprises a PPG sensor, said PPG sensor positioned in close proximity to the second lead, such that the PPG sensor is capable of obtaining a capillary signal simultaneously with the ECG signals, when the digit is received at the second lead.

~~22~~16. A non-transitory computer readable storage medium, having stored thereon computer code for instructing a processing unit to execute a method of determining atrial fibrillation risk, the method comprising,

obtaining a hemodynamic signal with a hemodynamic sensor;

detecting high risk patterns within the hemodynamic signal with a processor, wherein detecting high risk patterns comprises monitoring the area under the curve of pulses within the hemodynamic signal by the processor, and wherein high risk patterns are determined to be detected by the processor when the area under the curve of one or more pulses within the hemodynamic signal is less than a first pre-determined threshold;

triggering an obtaining of an electrocardiographic signal (ECG signal) with an electrocardiogram (ECG) sensor when said high risk patterns are detected with the processor;

determining pulse transit times (PTTs) between pulses of the ECG signal and the hemodynamic signal, by the processor; and

determining atrial fibrillation risk when the variability of the PTT exceeds a pre-determined PTT threshold, by the processor.

~~obtaining an electrocardiographic signal (ECG signal) with an ECG sensor; and,~~

~~determining atrial fibrillation risk based on the ECG signal and hemodynamic signal with a processor, the method further comprising,~~

~~detecting high risk patterns within the hemodynamic signal with the processor; and~~

~~triggering the obtaining of the ECG signal when high risk patterns are detected with the processor,~~

~~wherein detecting high risk patterns comprises~~

~~monitoring the area under the curve of pulses within the hemodynamic signal by the processor, and high risk patterns are determined to be detected by the processor when the area under the curve of one or more pulses is less than a first pre-determined threshold.~~

~~23. The non-transitory computer readable storage medium as claimed in claim 22, the method further comprising determining pulse transit times (PTTs) between pulses of the ECG signal and the hemodynamic signal by the processor, and~~

~~determining atrial fibrillation risk when the variability of the PTT exceeds a pre-determined PTT threshold by the processor.~~